# A REVIEW OF CANADA'S OIL AND GAS POTENTIAL WITH SPECIAL EMPHASIS ON THE ARCTIC

EXCERPTS FROM AN ADDRESS TO
THE 22nd ANNUAL CONFERENCE OF
THE FINANCIAL ANALYSTS FEDERATION

ST. LOUIS, MISSOURI

MAY, 1969

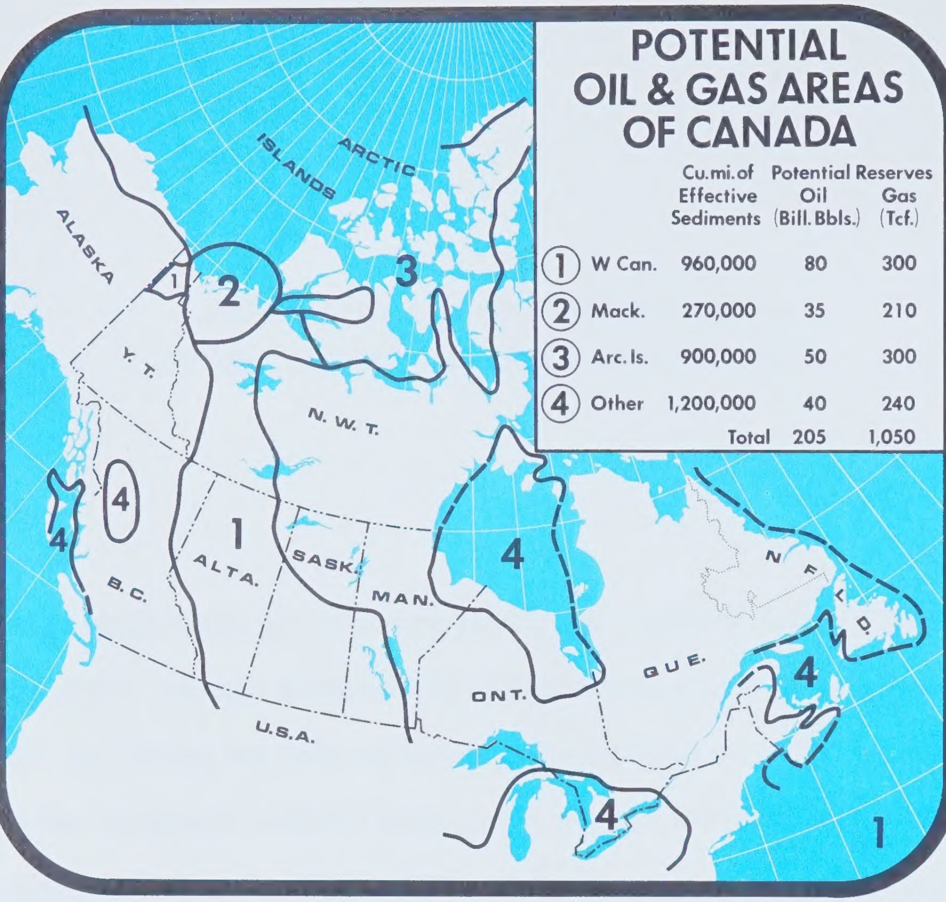
by
J. P. GALLAGHER
President of Dome Petroleum Limited

# CANADA'S OIL AND GAS POTENTIAL
# WITH SPECIAL EMPHASIS ON THE ARCTIC

The major Prudhoe Bay oil discovery on the north slope of Alaska has served as an exploration catalyst for northern Canada. Many of us have been working in the Arctic areas for the past ten years and, during that time, have publicly spoken of the great "Middle East type" oil and gas potentials of the area. However, it took a Prudhoe Bay to "light the flame".

Canada has an enormous undeveloped potential in natural resources including all types of minerals, fresh water, hydro-electric power and forestry products in addition to its oil and gas. Canada needs your long-term, knowledgeable investment funds.

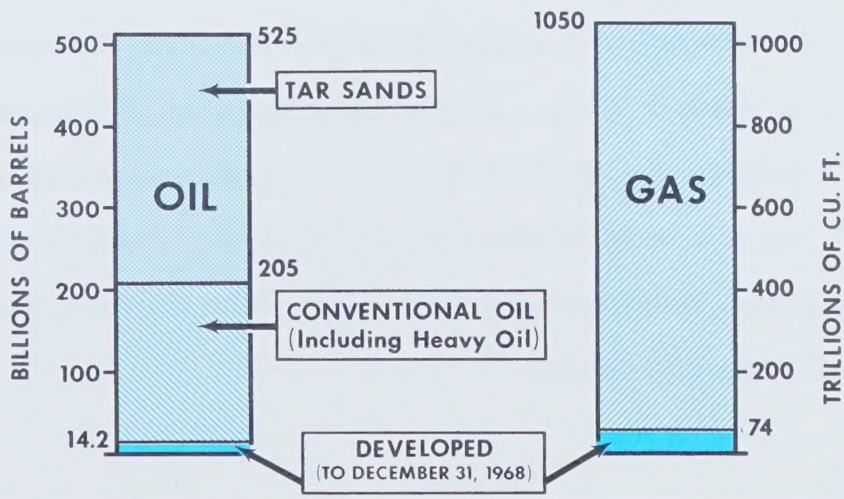
I will endeavour to illustrate Canada's oil and gas potentials and logistics in a series of slides. I realize that the mere development of massive reserves means relatively little to analysts unless they can be translated into near-term income. I will, therefore, conclude my remarks with a discussion of the immediate and the potential markets for these products over the next decade.




# POTENTIAL OIL & GAS AREAS OF CANADA

| | Cu. mi. of Effective Sediments | Potential Reserves Oil (Bill. Bbls.) | Potential Reserves Gas (Tcf.) |
|---|---|---|---|
| (1) W Can. | 960,000 | 80 | 300 |
| (2) Mack. | 270,000 | 35 | 210 |
| (3) Arc. Is. | 900,000 | 50 | 300 |
| (4) Other | 1,200,000 | 40 | 240 |
| | Total | 205 | 1,050 |

# CANADA'S EST. ULTIMATE RECOVERABLE OIL & GAS RESERVES




U.S. DEVELOPED RESERVES TO DEC. 31, 1968
126 BILLION BBLS. OIL & 632 TRILLION CU. FT. GAS

2

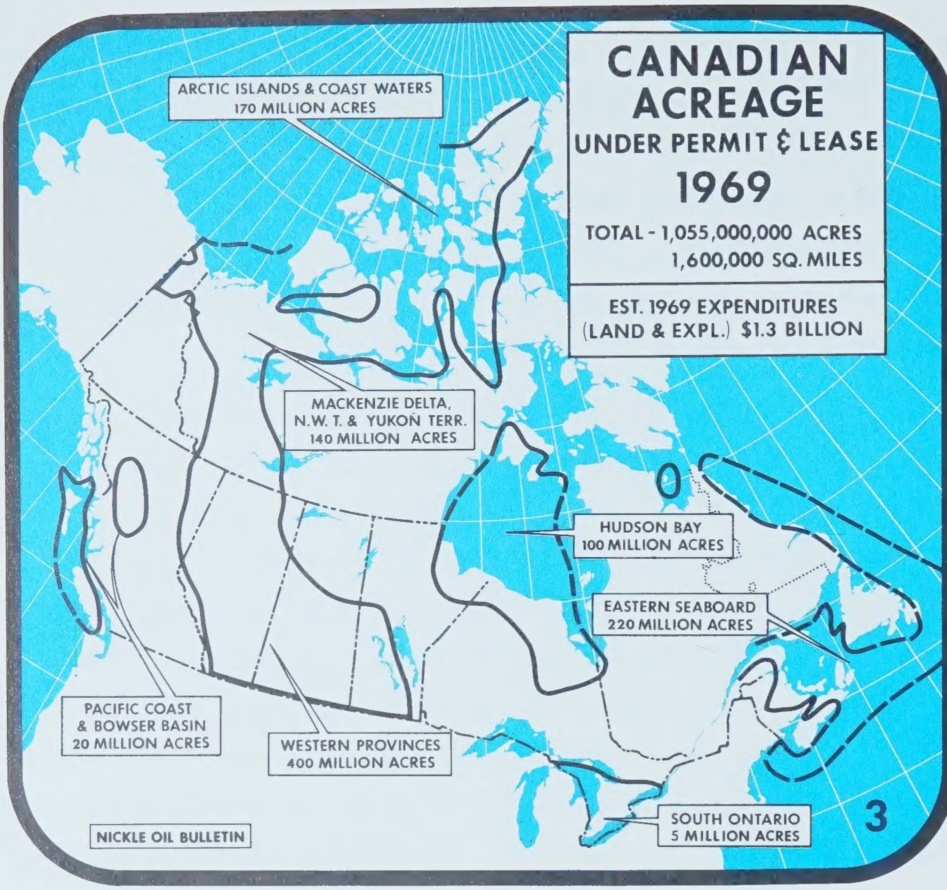
SLIDE #1 - shows Canada's potential oil and gas areas with reserve estimates of oil and gas based on the industry accepted parameters of calculating the volume of effective sediments, taking into account the age and type of the sediments, structural conditions, the presence or absence of oil and/or gas seeps and other factors. These estimates are considered conservative and are continuously being up-graded as exploration, drilling and production techniques are improved.

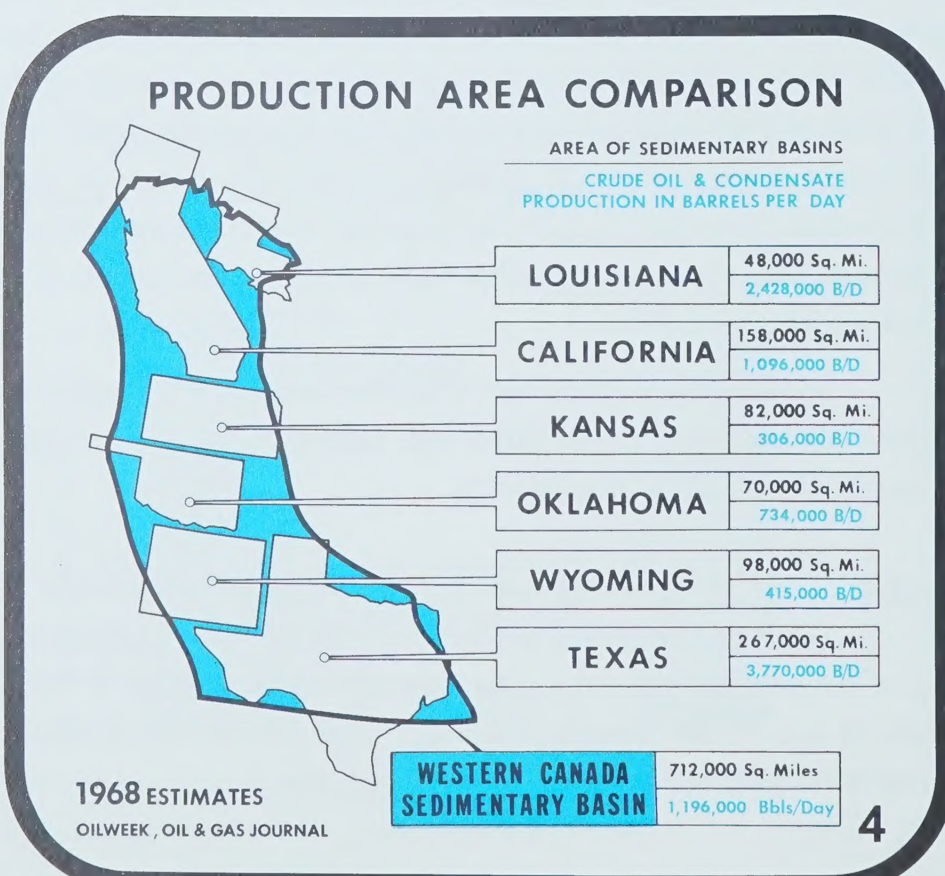
The optimum areas for the discovery of large accumulations of oil and gas are located in and adjoining the mobile belts of thick marine sedimentary basins. Western Canada has a 3,300-mile long thick marine sedimentary mobile belt stretching from the U.S. border north to the Arctic Ocean and northeast through the Arctic Islands. This area has all of the qualities that a geologist looks for in his search for a potential productive area. As indicated on the slide, the area north to the Mackenzie Delta has an estimated 80 billion barrels of oil and 300 trillion cubic feet of recoverable gas reserves. This total includes 50 billion barrels of light gravity crude and 30 billion barrels of heavy gravity oil recoverable by conventional methods. It excludes tar sands oil.

Areas 2 and 3 (the Mackenzie Delta and the Arctic Islands) have geological and stratigraphic conditions similar to those found on the North Slope of Alaska, with the major oil zone at Prudhoe Bay present in both these sedimentary basins. The estimated recoverable reserves from Areas 2 and 3 are 85 billion barrels of oil and 510 trillion cubic feet of gas. The other areas, labelled 4, consist mainly of the Gulf of St. Lawrence and the off-shore east coast, with minor potentials from the Hudson Bay area and the off-shore west coast. Estimated recoverable reserves for Area 4 are 40 billion barrels of oil and 240 trillion cubic feet of gas.

No allowance has been made in these total estimates for natural gas liquids and condensate associated with natural gas. These liquid reserves could readily exceed 25 billion barrels.

SLIDE #2 - is a graphic illustration of the estimated ultimate recoverable oil and gas reserves in Canada. The oil graph indicates 205 billion barrels of conventional oil and a minimum 320 billion barrels of tar sand oil, for a total of 525 billion barrels potential. Of this total only 14 billion barrels have been developed and partially produced to date.


CANADIAN ACREAGE
UNDER PERMIT & LEASE
1969
TOTAL - 1,055,000,000 ACRES
1,600,000 SQ. MILES
EST. 1969 EXPENDITURES
(LAND & EXPL.) $1.3 BILLION
ARCTIC ISLANDS & COAST WATERS
170 MILLION ACRES
MACKENZIE DELTA,
N.W.T. & YUKON TERR.
140 MILLION ACRES
HUDSON BAY
100 MILLION ACRES
EASTERN SEABOARD
220 MILLION ACRES
PACIFIC COAST
& BOWSER BASIN
20 MILLION ACRES
WESTERN PROVINCES
400 MILLION ACRES
SOUTH ONTARIO
5 MILLION ACRES
NICKLE OIL BULLETIN
3


PRODUCTION AREA COMPARISON
AREA OF SEDIMENTARY BASINS
CRUDE OIL & CONDENSATE
PRODUCTION IN BARRELS PER DAY
LOUISIANA
48,000 Sq. Mi.
2,428,000 B/D
CALIFORNIA
158,000 Sq. Mi.
1,096,000 B/D
KANSAS
82,000 Sq. Mi.
306,000 B/D
OKLAHOMA
70,000 Sq. Mi.
734,000 B/D
WYOMING
98,000 Sq. Mi.
415,000 B/D
TEXAS
267,000 Sq. Mi.
3,770,000 B/D
WESTERN CANADA
SEDIMENTARY BASIN
712,000 Sq. Miles
1,196,000 Bbls/Day
1968 ESTIMATES
OILWEEK, OIL & GAS JOURNAL
4

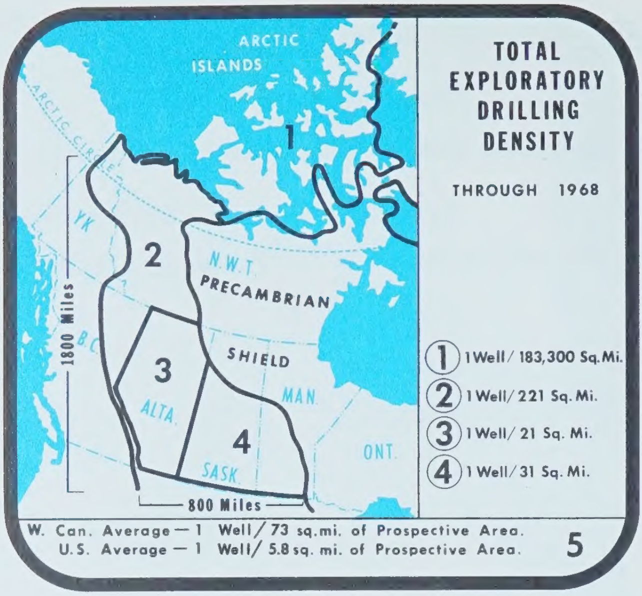
SLIDE #2 - Continued

The gas graph indicates 74 trillion cubic feet of gas developed to date of the total 1,050 trillion cubic feet.

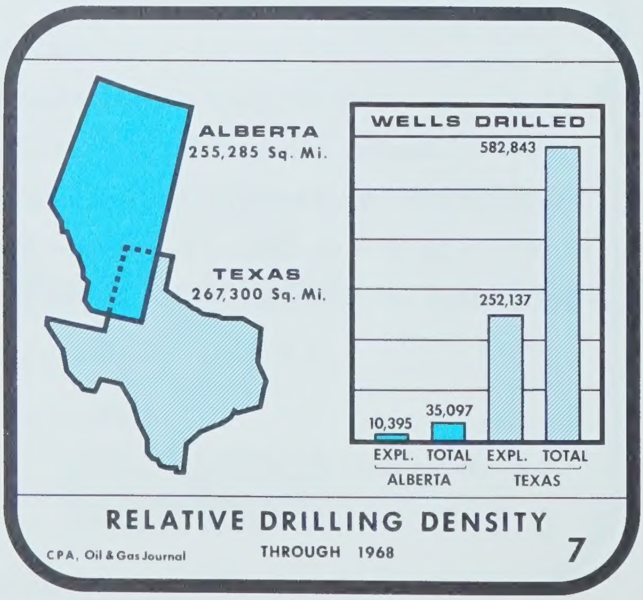
In contrast, U.S. reserves developed to December 31, 1968 total 126 billion barrels of oil and 632 trillion cubic feet of gas.

SLIDE #3 - indicates that a total of over one billion acres was held under oil and gas permits and leases as of February, 1969, of which over 170 million acres were held in the Arctic Islands. The 1969 expenditures for land, oil and gas exploration and development on these areas is estimated at $1.3 billion.

SLIDE #4 - indicates the size of the areas that we are dealing with in Canada. This slide shows that the 6 main productive States of the United States can readily fit into the Western Canadian sedimentary basin shown as Area 1 on Slide #1. These 6 States contain approximately 85% of the proved oil reserves in the U.S., exclusive of Alaska.


TOTAL EXPLORATORY DRILLING DENSITY
THROUGH 1968
ARCTIC ISLANDS
ARCTIC CIRCLE
YK
N.W.T.
PRECAMBRIAN
SHIELD
B.C.
ALTA.
SASK.
MAN.
ONT.
1800 Miles
800 Miles
1
2
3
4
1 1 Well / 183,300 Sq. Mi.
2 1 Well / 221 Sq. Mi.
3 1 Well / 21 Sq. Mi.
4 1 Well / 31 Sq. Mi.
W. Can. Average — 1 Well / 73 sq. mi. of Prospective Area.
U.S. Average — 1 Well / 5.8 sq. mi. of Prospective Area.
5


EXPLORATORY WELLS · DEVONIAN (& Lower) DRILLING DENSITY
THROUGH 1968
ARCTIC ISLANDS
ARCTIC CIRCLE
YK
N.W.T.
PRECAMBRIAN
SHIELD
B.C.
ALTA.
SASK.
MAN.
ONT.
1800 Miles
800 Miles
1
2
3
4
1 1 Well / 183,300 Sq. Mi.
2 1 Well / 649 Sq. Mi.
3 1 Well / 39 Sq. Mi.
4 1 Well / 110 Sq. Mi.
43.6% of all Explor. wells in W. Can. penetrated Devonian
or 1 Well / 167 sq. miles of Prospective Area.
6


ALBERTA
255,285 Sq. Mi.
TEXAS
267,300 Sq. Mi.
WELLS DRILLED
10,395
35,097
252,137
582,843
EXPL.
TOTAL
EXPL.
TOTAL
ALBERTA
TEXAS
RELATIVE DRILLING DENSITY
THROUGH 1968
CPA, Oil & Gas Journal
7

SLIDE #5 - shows the number of exploratory wells drilled in the various prospective areas of Western Canada, exclusive of the Hudson Bay and the west coast basins. As of the end of 1968, only one exploratory well had been drilled in Western Canada per 73 square miles of prospective area, compared to an average of one exploratory well per 5.8 square miles of prospective area in the United States.

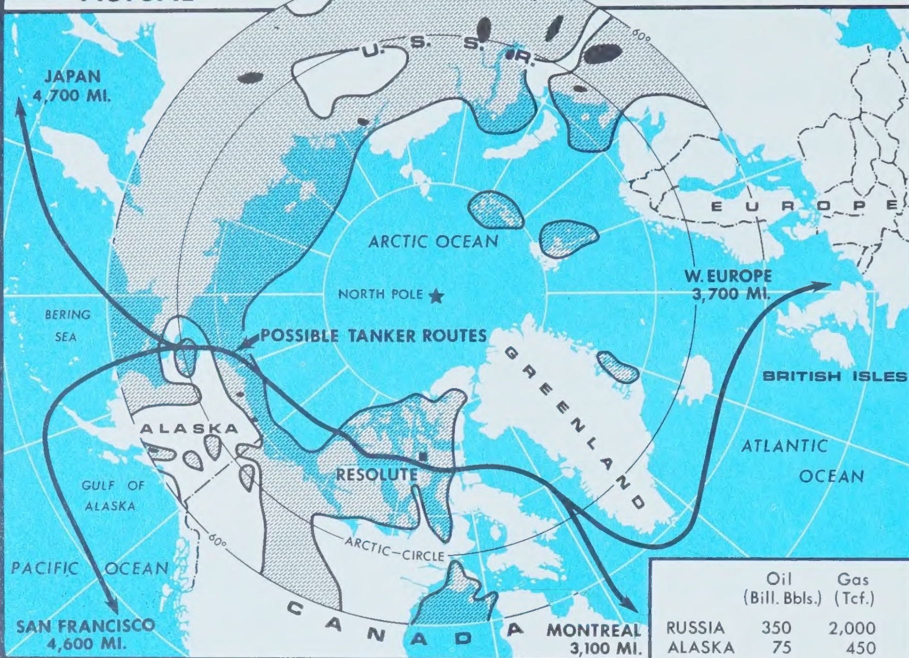
SLIDE #6 - shows the exploratory drilling density per prospective square mile by wells that have at least tested beds of Devonian age. Only 43.6% of all exploratory wells drilled in the Western Canadian basins tested the highly potential Devonian or deeper horizons, where over 70% of Western Canadian proved oil and gas reserves have been found to date. That is, only one Devonian exploratory well has been drilled per 167 square miles of prospective area.

Slides 5 and 6 indicate that the Western Canadian potential has only been scratched compared to comparable areas in the United States. A long-term, expanding market is required to increase the exploration incentive in Canada.

SLIDE #7 - shows that Alberta and Texas are approximately equal in size. They also have approximately the same potentially productive sedimentary basin areas. Although Alberta is the most thoroughly tested Province in Western Canada, there have been 24 exploratory wells drilled in Texas for each exploratory test drilled in Alberta.

# ARCTIC OIL & GAS AREAS

ACTUAL — POTENTIAL



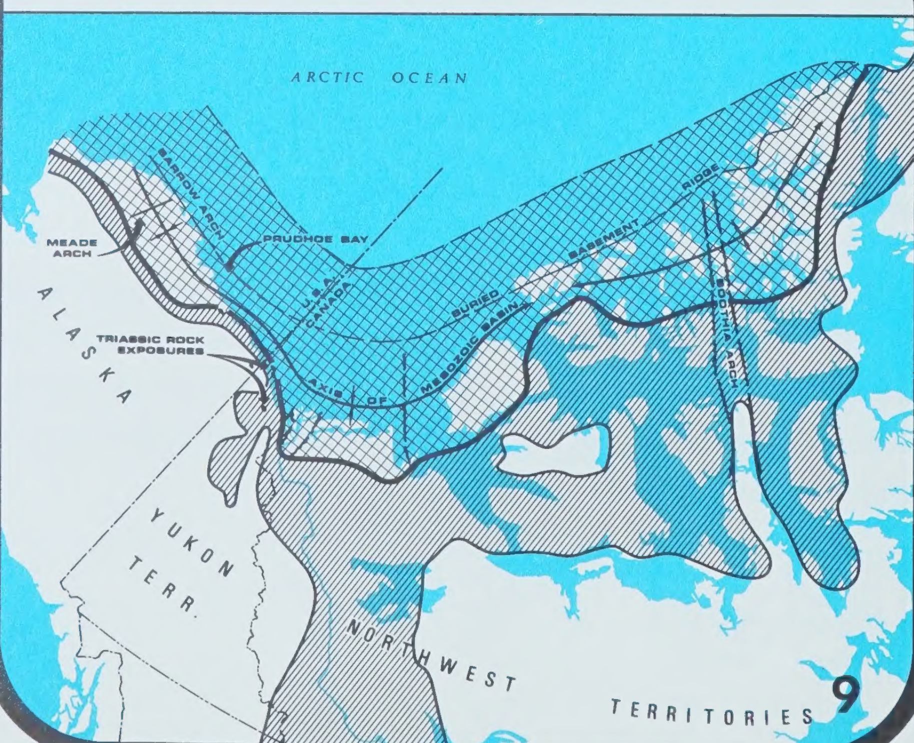

|  | Oil (Bill. Bbls.) | Gas (Tcf.) |
|---|---|---|
| RUSSIA | 350 | 2,000 |
| ALASKA | 75 | 450 |
| CANADA | 105 | 630 |
| OTHER | 20 | 120 |
| TOTAL : | 550 | 3,200 |

EST. ULTIMATE RECOVERABLE RESERVES (NORTH OF LAT. 60°)

8

## MESOZOIC & PALEOZOIC ARCTIC BASINS

PALEOZOIC — MESOZOIC



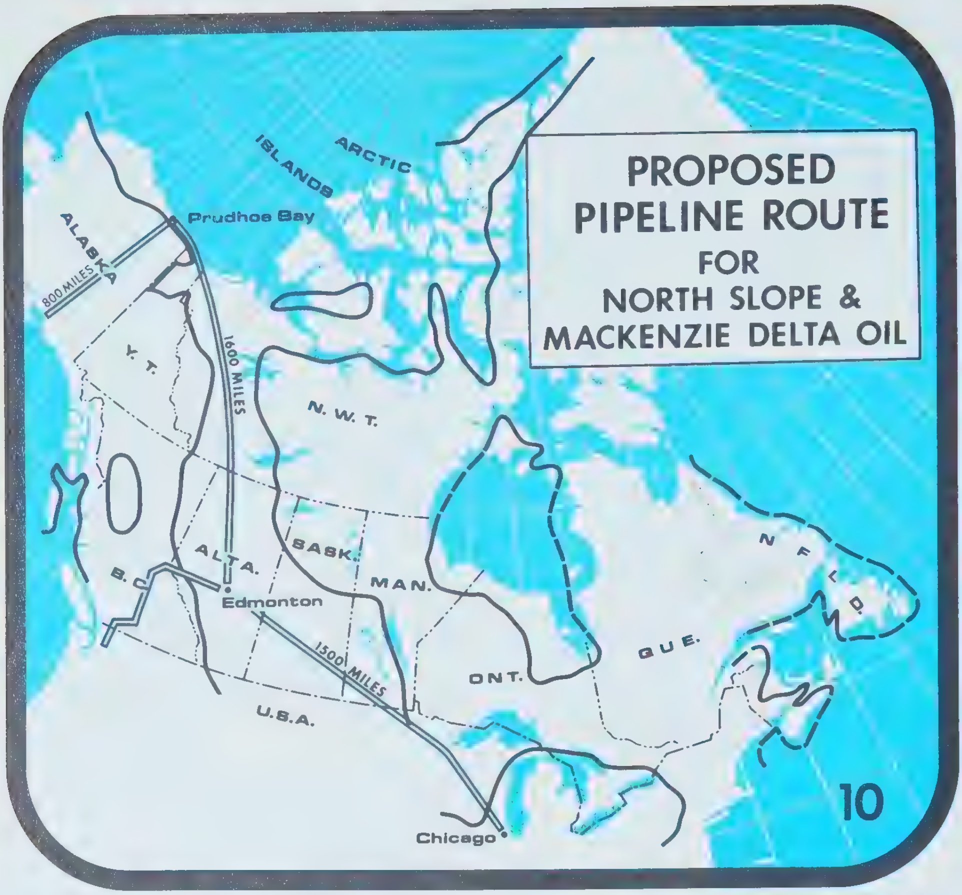

9

SLIDE #8 - shows the potential and producing oil and gas areas in Russia, Alaska, Canada and Europe, north of the 60th parallel. It is obvious that the U.S.S.R. has by far the greatest potential in the Arctic sedimentary basins and to date has discovered massive reserves, mainly of gas, in western Siberia. Estimated reserves for the U.S.S.R., north of the 60th parallel, are 350 billion barrels of oil and 2,000 trillion cubic feet of gas, vs. 75 billion barrels of oil and 450 trillion cubic feet of gas in Alaska, 105 billion barrels of oil and 630 trillion cubic feet of gas in northern Canada and 20 billion barrels of oil and 120 trillion cubic feet of gas in the Norwegian Spitsbergen Islands. Total estimated ultimate recoverable reserves, north of the 60th parallel, exceed 550 billion barrels of oil and 3,200 trillion cubic feet of gas. This compares with estimated world oil reserves developed to date of approximately 400 billion barrels, over 75% of which are located in the Middle East, Africa and southern Russia. This 400 billion barrel figure excludes tar sands and oil shales.

This slide also shows the proximity of Arctic oil to the principal consuming centres of the world. Using Resolute as a centre, the rapidly expanding markets on the East Coast of North America and Western Europe are only 3,100 and 3,700 miles respectively by tanker. San Francisco and Japan, via the Bering Straits, are 4,600 and 4,700 miles from Resolute.

SLIDE #9 - illustrates the relative position and similarity of the highly prospective Mesozoic and Paleozoic Arctic basins, namely, the North Slope of Alaska, the Mackenzie Delta and the northern half of the Arctic Islands. The geological significance of this slide is the apparent buried basement ridge which occurs north and off-shore from Prudhoe Bay and is traceable by geophysics throughout the 3 basin areas. The presence of this old buried basement ridge causes the change in the lithology of the Triassic beds from shale to sand in moving northward from the foothills of the Brooks Range to the coastline. This facies change accounts for the highly porous and permeable Triassic oil pay-zone at Prudhoe Bay. These same Triassic sands are exposed on northwest Melville Island in the Arctic Islands, where they are filled with an asphaltic tar, indicating excellent hydrocarbon potential for the area.

Offshore seismic in the Mackenzie Delta and on-shore seismic in the Arctic Islands has been highly definitive to date and has indicated large and well developed structural features, essential for the accumulation of petroleum reserves.





SLIDES 12,13,14,15 & 18 ARE NOT REPRODUCED.

SLIDE #10 - shows the proposed pipeline route from Prudhoe Bay southwest to the ice-free port of Valdez in south Alaska. This 800-mile pipeline route crosses some of the most rugged terrain on the North American continent, which drastically increases the cost and reduces the carrying capacity. The estimated cost of a 48" line along this route is approximately $900 million. This trans-Alaska route was announced by the ARCO-Humble-B. P. interests involved, but is far from definite in that other means of moving Prudhoe Bay oil are still being thoroughly investigated by the group.

We in Canada have been promoting the building of a pipeline from Prudhoe Bay east to the Mackenzie Delta and up the Mackenzie River to Edmonton and Chicago. The cost of a 42" line from Prudhoe Bay to Chicago is estimated at approximately $1 billion and would carry approximately 1-1/2 million barrels of oil/day when on full pump.

This proposed line would follow the relatively flat terrain of the Mackenzie Delta and the Western plains, which are prospective producing areas throughout the entire length of the pipeline. Due to the difference in terrain traversed the proposed 42" Mackenzie line would be capable of carrying at least the same volumes as the proposed 48" trans-Alaskan pipeline and would cost very little more despite its 3,100 mile length to Chicago.

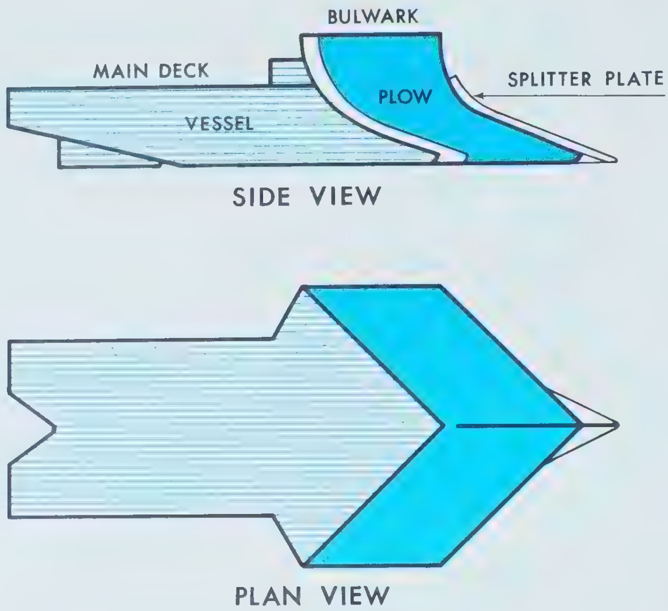
From a U. S. point of view, the Mackenzie line would provide the security of overland supply to the major crude deficient area in the U. S. mid-west, vs. the vulnerable and high labour-content tanker haul involved from Alaska to the U. S. west coast and possible subsequent pipeline movement east.

From a Canadian point of view, the Mackenzie route would advance the exploration and development of the areas traversed by at least 10 years, especially if Canada provided half the cost of the line and in return obtained a prorateable "put" into the pipeline in direct proportion to the reserves proved up along the pipeline route and at the same time obtained the complete removal of all restrictions and tariffs on Canadian crude oil moving into the U. S. The pipeline tariff from Prudhoe Bay to Chicago has been estimated at $1. 00 to $1. 25/barrel, which would net a minimum of $2. 00/barrel at Prudhoe Bay. The annual growth rate of the U. S. crude oil market is in excess of 500 thousand barrels/day/year. If the Mackenzie pipeline was completed in 1972, the U. S. market would have increased by more than enough to take care of the entire throughput.

SLIDE #11 - shows the enlarged map of the Canadian Arctic Islands sedimentary basin where a consortium of Canadian mining companies, Canadian independent oil companies and the Canadian Government are carrying out a major exploration and drilling program covering 50 million acres held under permits and farmout arrangements. The consortium, known as Panarctic Oils Ltd., is committed to spend a minimum of $20 million and is currently drilling at 2 locations on Melville Island, as indicated by the arrows on the map.

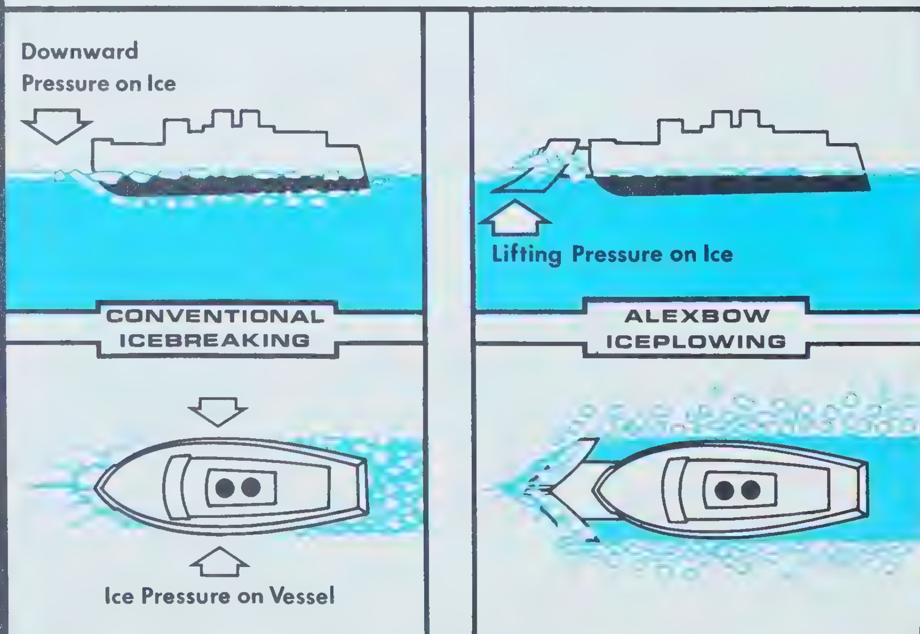
Geologically the Arctic Islands are highly attractive and, as shown on the Arctic route map, lie only 3,700 miles from major petroleum markets in Western Europe and the Eastern United States. This summer a group of major oil companies, headed by Standard (New Jersey), plans on taking a 115,000-ton

# ALEXBOW ICE PLOW




16

# COMPARATIVE ICEBREAKING METHODS




17

SLIDE #11 - Continued

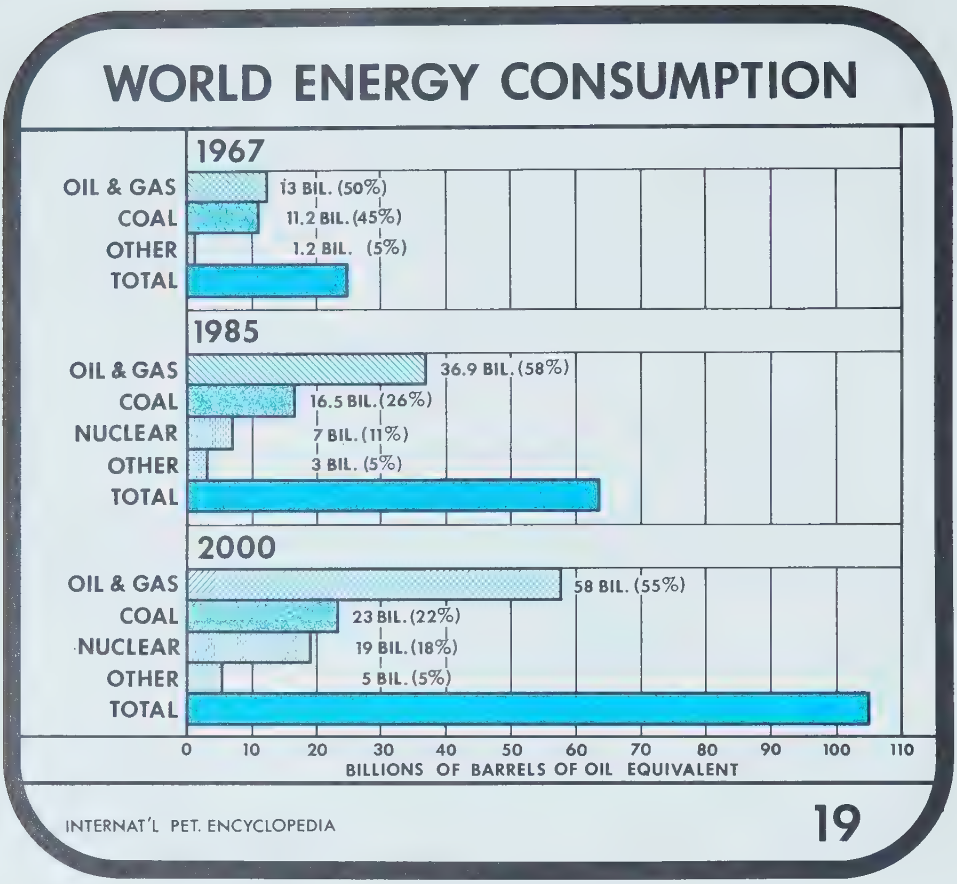
specially re-fitted tanker from Prudhoe Bay through the Arctic Islands in order to test the feasibility of transporting Prudhoe Bay and Arctic oil to the east coast of the U.S. and Western Europe. Estimated tariffs in American-owned ships are 50¢ to 60¢/barrel from Prudhoe Bay to either Western Europe or the U.S. east coast, which would mean that Arctic Island oil could, conceivably, be delivered to the same areas in non-American bottoms at less than 40¢/barrel.

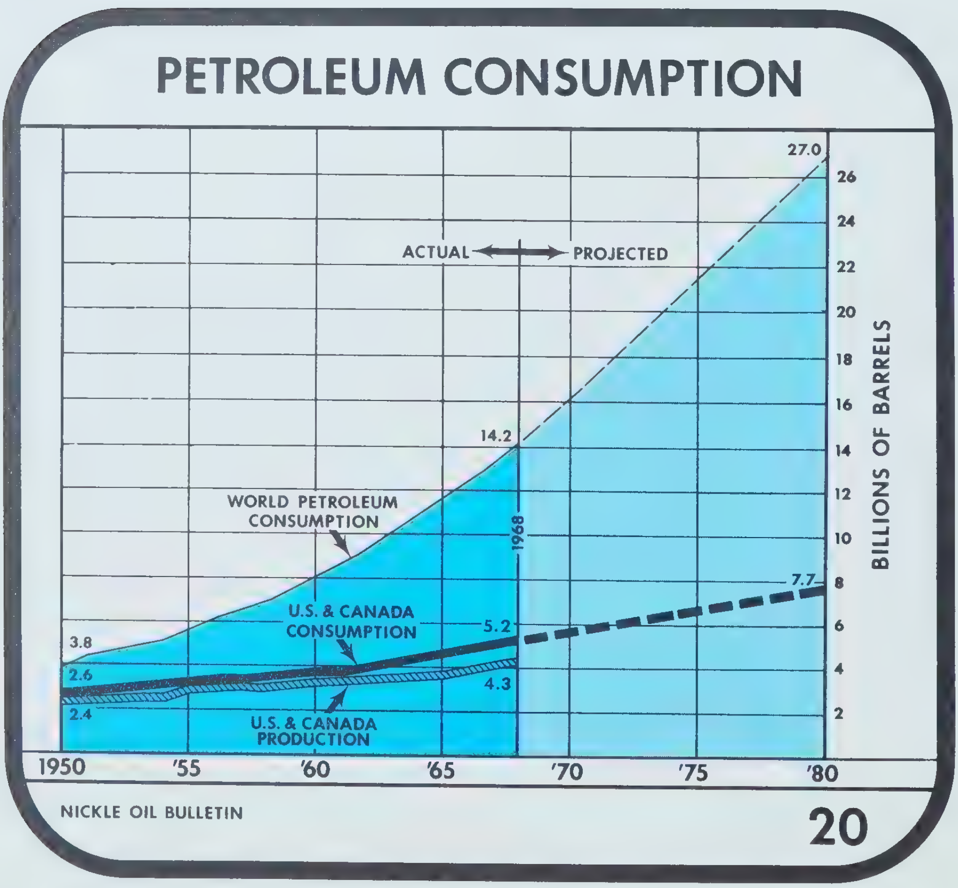
SLIDES #12 to #15 Inclusive - are pictorial views of the terrain, the highly potential geological structures which are found on the surface and the type of helicopter-supported geophysical operations conducted during 1968 in the Arctic Islands. These slides are not reproduced in this text.

SLIDES #16 & #17 - Part of the Panarctic project in the Arctic Islands has been a logistical study on methods of transporting supplies and crude oil in these ice-bound areas. One phase of this study involves the development of a new method of plowing rather than breaking ice. The invention, in which Panarctic has a controlling interest, is known as the Alexbow, after its inventor, Scott Alexander of Ottawa, Canada. These slides illustrate the Alexbow ice plowing principle. Experiments with an Alexbow-equipped barge in Arctic ice during the summer of 1968 proved very encouraging. Additional trials with an Alexbow-equipped ice-breaker are scheduled for next fall. If either the Alexbow principle or the Manhattan tanker experiments conducted by the Standard (New Jersey) group prove successful, it will alter the entire economics of natural resource development and commercial transportation in the polar areas.

If neither of the projects proves successful, pipeline feasibility studies have been completed which indicate that a pipeline could be laid across the Islands, on the sea bottom between the Islands and carried east to continuously open water between Ellesmere Island and Greenland.

SLIDE #18 - which is not reproduced, shows a series of pictures of the Alexbow-equipped barge undergoing ice trials in the Arctic during the summer of 1968.

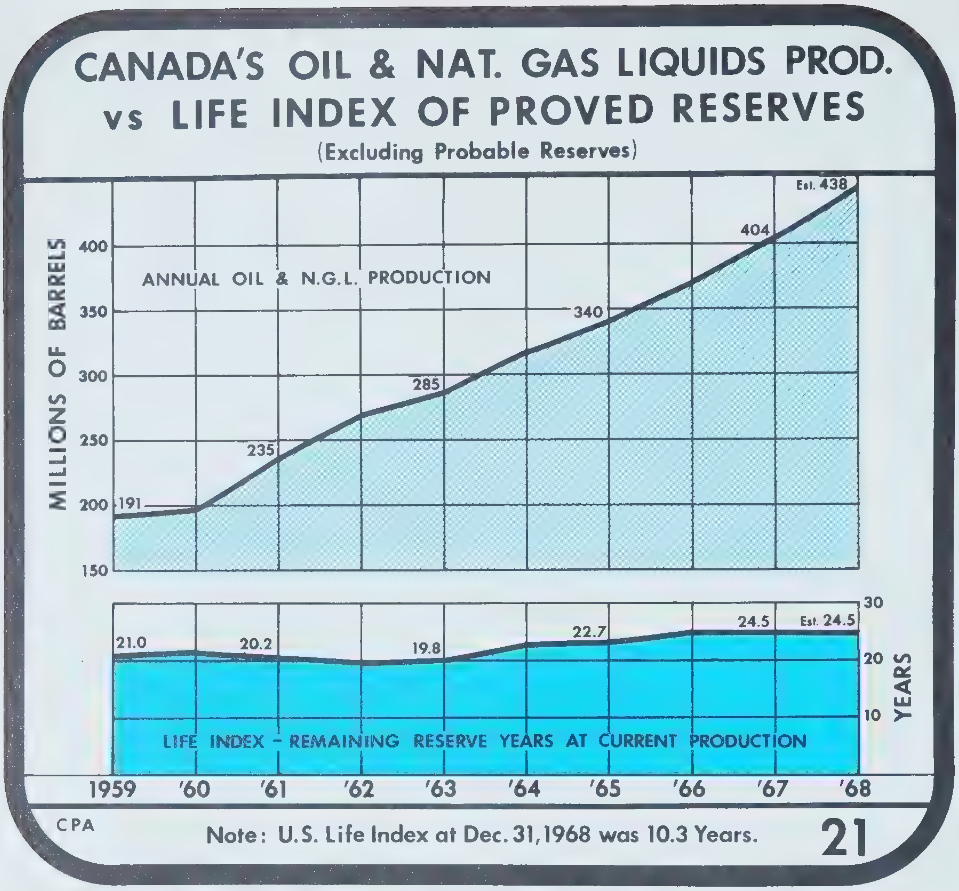

WORLD ENERGY CONSUMPTION
1967
OIL & GAS
13 BIL. (50%)
COAL
11.2 BIL. (45%)
OTHER
1.2 BIL. (5%)
TOTAL
1985
OIL & GAS
36.9 BIL. (58%)
COAL
16.5 BIL. (26%)
NUCLEAR
7 BIL. (11%)
OTHER
3 BIL. (5%)
TOTAL
2000
OIL & GAS
58 BIL. (55%)
COAL
23 BIL. (22%)
NUCLEAR
19 BIL. (18%)
OTHER
5 BIL. (5%)
TOTAL
0 10 20 30 40 50 60 70 80 90 100 110
BILLIONS OF BARRELS OF OIL EQUIVALENT
INTERNAT'L PET. ENCYCLOPEDIA
19


PETROLEUM CONSUMPTION
27.0
ACTUAL
PROJECTED
14.2
WORLD PETROLEUM CONSUMPTION
1968
7.7
U.S. & CANADA CONSUMPTION
5.2
3.8
2.6
4.3
2.4
U.S. & CANADA PRODUCTION
2 4 6 8 10 12 14 16 18 20 22 24 26
BILLIONS OF BARRELS
1950 '55 '60 '65 '70 '75 '80
NICKLE OIL BULLETIN
20

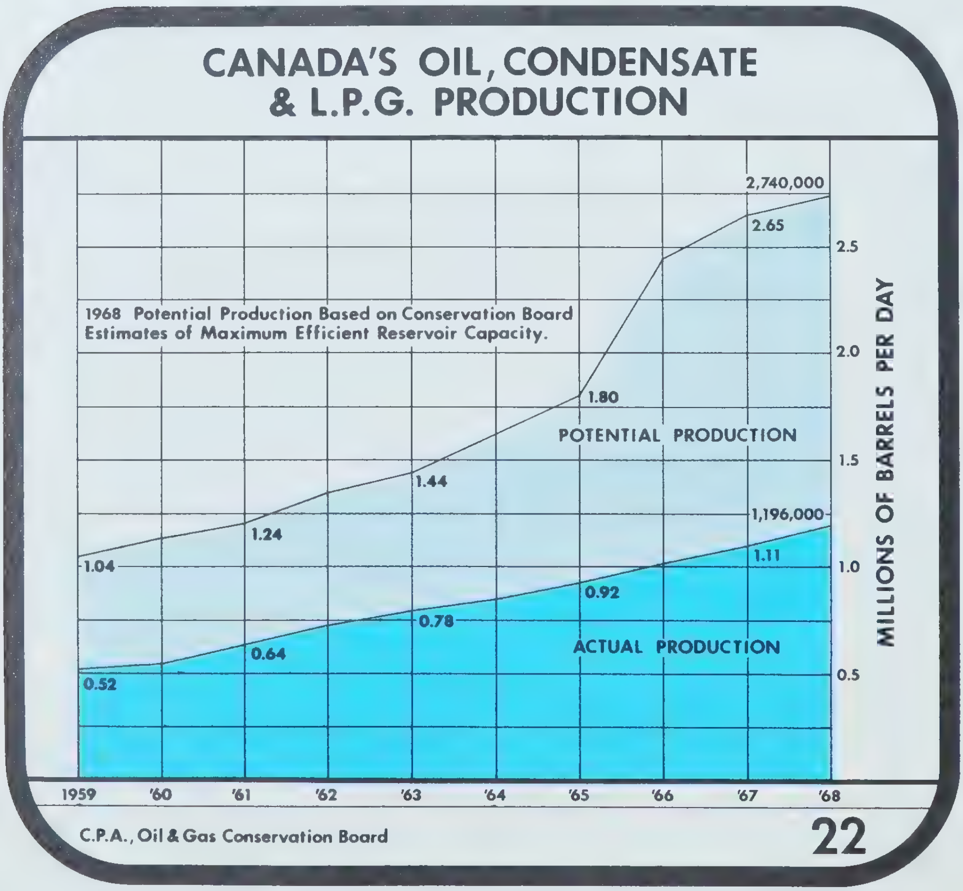
SLIDE #19 - shows world energy consumption for 1967, 1985 and the year 2000, in billions of barrels of oil equivalent. During this 32-year period it is estimated that the world energy consumption will show a 4-fold increase from 25 billion barrels to 105 billion barrels per year. The majority of this rapid increase takes place in the under-developed parts of the world. It will be noted that oil and gas is expected to provide slightly over 50% of the estimated energy consumption through to the year 2000. In 1967 coal provided approximately 45% of the energy consumed and although the quantity of coal utilized more than doubles in the year 2000, its percentage of total is expected to drop to 22%, with nuclear energy taking its place. It is interesting to note that over 59% of the proved coal reserves of the world are located in the United States and Canada. By a fairly simple hydrogenation process, coal can readily be converted to natural gas and petroleum liquid products. The "Other" category shown on the slide represents hydroelectric power, which holds its position at approximately 5% of total energy consumed.

SLIDE #20 - shows North American and world actual and estimated petroleum consumption from 1950 through 1980. In 1968 the U.S. and Canada consumed 5.2 billion barrels of oil and produced 4.3 billion barrels of oil. The 900 million barrel difference was imported. In 1980 the U.S. and Canada will consume an estimated 7.7 billion barrels of oil.

In 1968 the world consumed 14.2 billion barrels of oil, increasing to an estimated 27 billion barrels of oil in 1980. Obviously there is a need for many more Prudhoe Bays and the areas north of the 60th parallel appear to have the greatest potential.

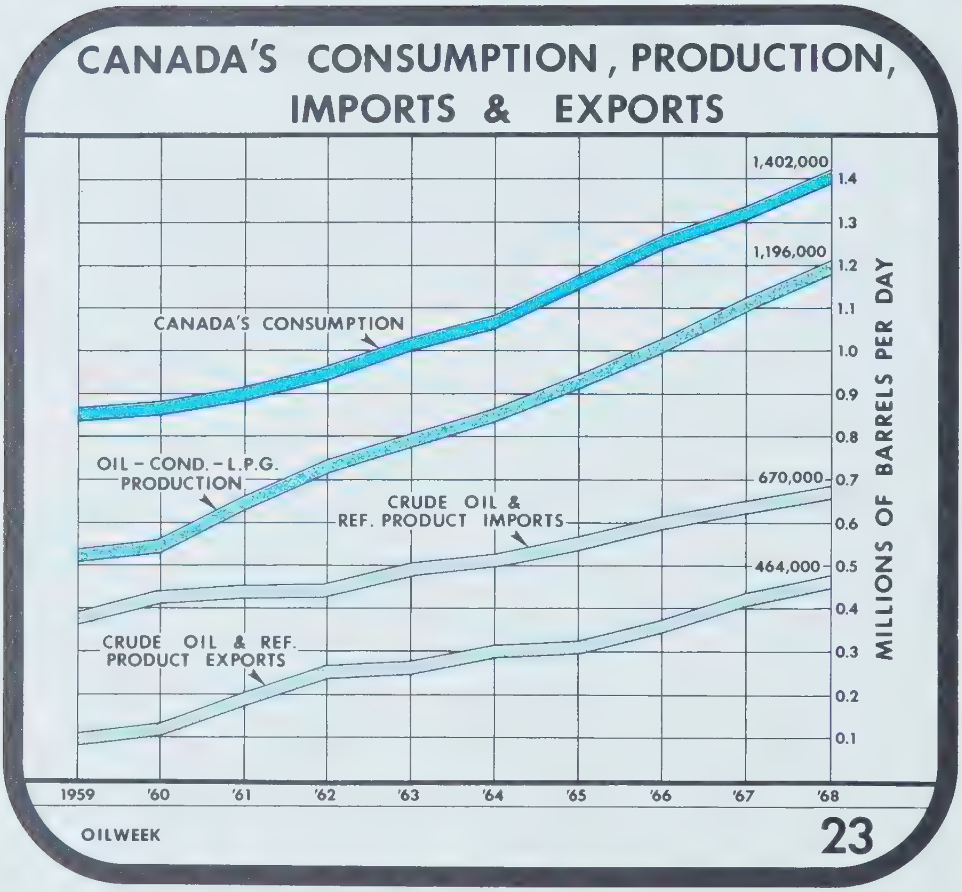



Note 1: The Canadian life index includes unreported confidential reserves.
Note 2: The U.S. life index is 12.9 years if North Slope Alaska reserves are included at 10 billion barrels.



SLIDE #21 - brings us back from the world of great future potentials of the north to the actualities of oil reserves and production in Canada today. This slide shows Canada's oil production over a 10-year period ending in 1968 when 438 million barrels were produced. It also shows a life index for Canada's proved oil reserves for 1968 of 24.5 years. This life index is approximately double that of the U.S. after allowing for a 10 billion barrel field at Prudhoe Bay, Alaska.

SLIDE #22 - illustrates that Canada's 1968 production of 1,200,000 barrels per day was only 45% of its potential productive capacity of 2,740,000 barrels/day as determined by the Provincial Conservation Boards. Approximately 2 million barrels/day of this productive capacity represent developed wellhead capacity.


CANADA'S CONSUMPTION, PRODUCTION, IMPORTS & EXPORTS
1,402,000
1,196,000
670,000
464,000
CANADA'S CONSUMPTION
OIL - COND. - L.P.G. PRODUCTION
CRUDE OIL & REF. PRODUCT IMPORTS
CRUDE OIL & REF. PRODUCT EXPORTS
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
MILLIONS OF BARRELS PER DAY
1959
'60
'61
'62
'63
'64
'65
'66
'67
'68
OILWEEK
23

SLIDE #23 - shows Canadian consumption, production, imports and exports.

During 1968 Canada imported approximately 50% of the total petroleum consumed in Canada for an expenditure of approximately $700 million even though Canada was capable of producing more than twice its current rate.

During 1968 Canada exported an average of 464,000 barrels of crude oil and products to the United States leaving an excess of imports over exports of 206,000 barrels per day resulting in a petroleum trade deficit of over $200 million per year.

These figures illustrate:

(1) That Canada is far too dependent on off-shore petroleum supplies for its highly industrialized area east of the Ottawa Valley.

(2) That Canada is seeking enlarged petroleum markets in the United States while it continues to permit a major expansion in the volume of duty-free oil moving into its eastern markets.

(3) That Canada must supply a higher percentage of its own market in order to have greater acceptance of its petroleum in the U.S. markets and in order to help create the exploration incentive required to develop its oil and gas potential. The great petroleum potential north of the 49th parallel in Canada and Alaska, combined with the rapidly expanding petroleum market and diminishing reserves south of the 49th parallel, indicates an urgent need for a Continental Oil Policy. Such a policy would imply the complete removal of all restrictions and tariffs on the free movement of North American crude oil and products into their most economic markets and it would also imply the acceptance by both countries of comparable restrictions on the importation of off-shore petroleum.

During 1968, the United States imported a total of 2,800,000 barrels per day or approximately 21% of its total petroleum requirements of which 2,340,000 barrels or 17% of the total U.S. demand was supplied by countries outside of North America. If Canada adopted a similar import policy, namely 17% of domestic demand, in 1968 it would have restricted imports to 240,000 barrels per day and increased the use of Canadian crude by 430,000 barrels per day, for a saving in foreign exchange of approximately $430 million.

From a Canadian point of view, we have a major political problem to overcome in restricting the use of off-shore oil imports into Quebec and our Maritime provinces. Pipeline feasibility studies have been completed which indicate that Western Canadian crude oil could be landed at Quebec refineries for a price which should not appreciably increase product prices to Quebec consumers. The impact of a minor price increase could be materially softened by utilizing any or all of the following methods during the transition or volume build-up period in which Canada moves from the current 50% imports to restrictions comparable to U.S. import controls.

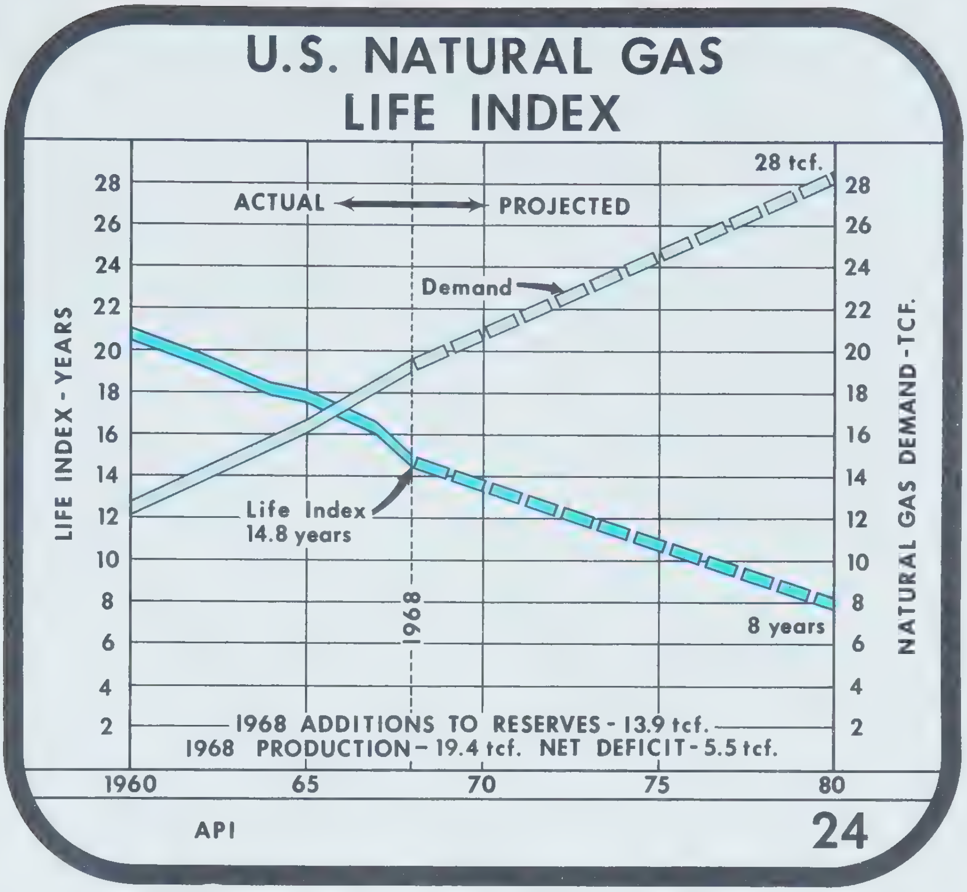
(a) Direct income tax incentives to Quebec refineries in proportion to their use of Western Canadian crude.

(b) Direct income tax incentives to Interprovincial pipeline in respect to the movement of Western Canadian crude east of the Ottawa Valley.

(c) Humping of Interprovincial pipeline tariffs between Chicago, Sarnia, Toronto and Montreal similar to railroad freight rate adjustments to seaborne competition. Canadian oil moving into the Minneapolis-Chicago-Buffalo areas is currently selling at an average of 40¢ per barrel below comparable U.S. domestic crude at these points. An average 30¢ increase in the Edmonton-U.S. mid-west pipeline tariffs would still leave Canadian crude competitive in these areas but would help dampen the U.S. producers' opposition to the expanding invasion of these markets by lower-priced Canadian crude. This increased pipeline profit on deliveries into the U.S. mid-west could be used to lower pipeline tariffs into Montreal and bring the landed cost of Western Canadian crude closer to the average landed cost of off-shore crude in Montreal.

The United States also has a major political problem in expanding Canadian imports of crude oil as the smaller U.S. domestic producers are opposed to increasing petroleum imports into the United States from any source.

Recent studies by major U.S. oil companies indicate that reserve productive capacity in the United States (exclusive of Alaska) is rapidly evaporating. Texas and Louisiana are the only two major producing states with a significant extra oil producing capacity and both of these are expected to peak out within the next 3 to 5 years. Currently the United States is consuming approximately 5 billion barrels of oil per year with an average anticipated increase in demand amounting to 200 million barrels per year. A 10 billion barrel Prudhoe Bay oilfield is, therefore, being consumed every 2 years in terms of U.S. current demand.




<u>SLIDE #24</u> - illustrates the even greater crisis that is becoming apparent in the U.S. gas supply. In 1968 U.S. gas production totalled 19.4 trillion cubic feet while gross additions to reserves were 13.9 trillion cubic feet for a decline in proved reserves of over 5.5 trillion cubic feet. Even if the U.S., over the next ten years, adds to its proved reserves at a rate of 20 trillion cubic feet per year (or 150% of the 1968 discovery rate) the projected demand of 28 trillion cubic feet in 1980 will decrease the U.S. life index from the current 14.8 years to approximately 8 years. In contrast, Canada is adding approximately 3 cubic feet of gas reserves for each cubic foot produced. As a result, Canada's current gas life index of approximately 40 years, has on average, shown a substantial annual increase.

---

The energy hungry U.S. economy urgently needs Canadian gas now and will require our oil in the very near future. As the discovery and development of large gas reserves is an integral part of exploration for oil, it is in the self interest of the U.S. to continue increasing the market for Canadian oil and thereby encourage the expanded exploration effort necessary for the full appraisal and development of North America's oil and gas potential.

## CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS

**Six Months Ended June 30, 1969 and 1968**

| | *1969* | *1968* |
|---|---|---|
| SOURCE OF FUNDS: | | |
| Cash income from operations | $ 6,601,000 | $ 7,083,000 |
| Proceeds from debenture issue | — | 15,000,000 |
| Proceeds from bank loans | 1,500,000 | — |
| Proceeds from issues of capital stock | 160,000 | 78,000 |
| | 8,261,000 | 22,161,000 |
| APPLICATION OF FUNDS: | | |
| Expenditures for property, plant and equipment | 11,233,000 | 8,629,000 |
| Reduction of long-term debt | 4,852,000 | 4,125,000 |
| Increase in other assets | 252,000 | 239,000 |
| | 16,337,000 | 12,993,000 |
| INCREASE (DECREASE) IN WORKING CAPITAL: | * $(8,076,000) | $ 9,168,000 |

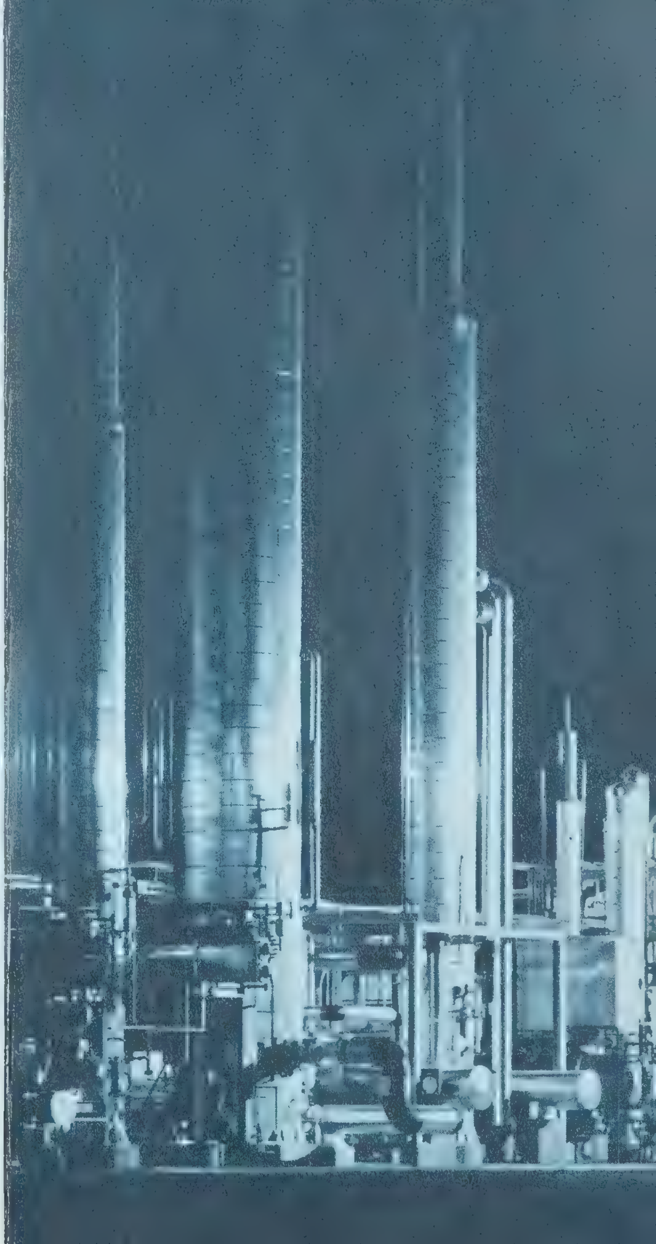
THIS STATEMENT IS UNAUDITED.

* Decrease in working capital results from major capital expenditures paid from interim bank financing which will be refunded by long-term loans to be drawn down in 1970.

PRINTED IN CANADA

# DOME PETROLEUM LIMITED

## INTERIM REPORT JUNE 30, 1969



During the first half of 1969, the Company maintained production levels comparable with last year although income declined slightly from the 1968 level due to lower product prices and higher interest rates on new debt.

## FINANCIAL

— Gross income totalled \$11,963,000 (\$12,017,000 at June 30, 1968).

— Cash flow totalled \$6,601,000 (\$7,083,000 in 1968).

— Net income totalled \$4,431,000 (\$4,946,000 in 1968).

Marketing trends indicate that the price for natural gas liquids should strengthen by year-end.

## PRODUCTION

Oil, natural gas liquids and oil equivalent of gas production to June 30, 1969, averaged 24,112 net barrels per day compared with 24,153 net barrels per day in the first half of 1968.

## DRILLING

The Company participated in drilling 36 wells during the first 6 months (26 exploratory tests) resulting in 7 oil wells (3.25 net) and 7 gas wells (3.63 net).

## EXPLORATION AND LAND

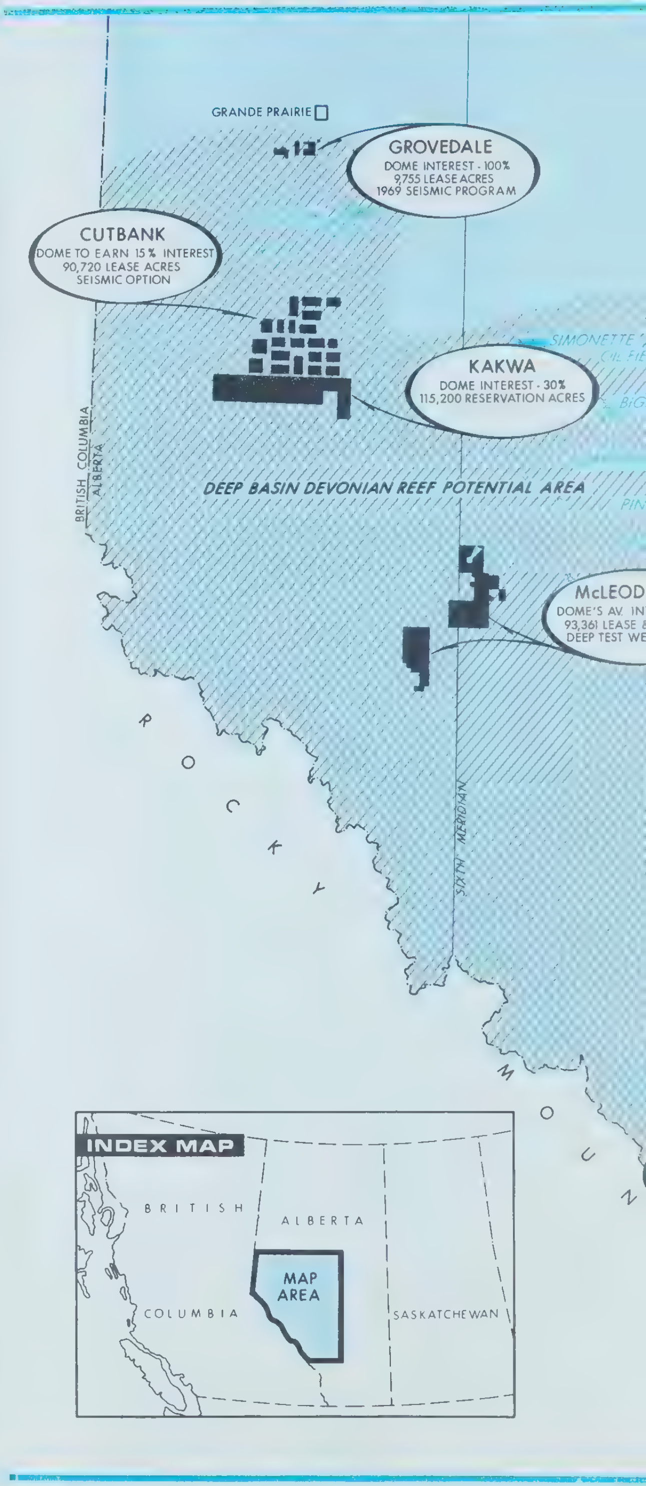
Discovery gas wells were completed in the Castor, Tate, Francis and Atlee areas of Alberta, and the LaGarde and Helmet areas of British Columbia.

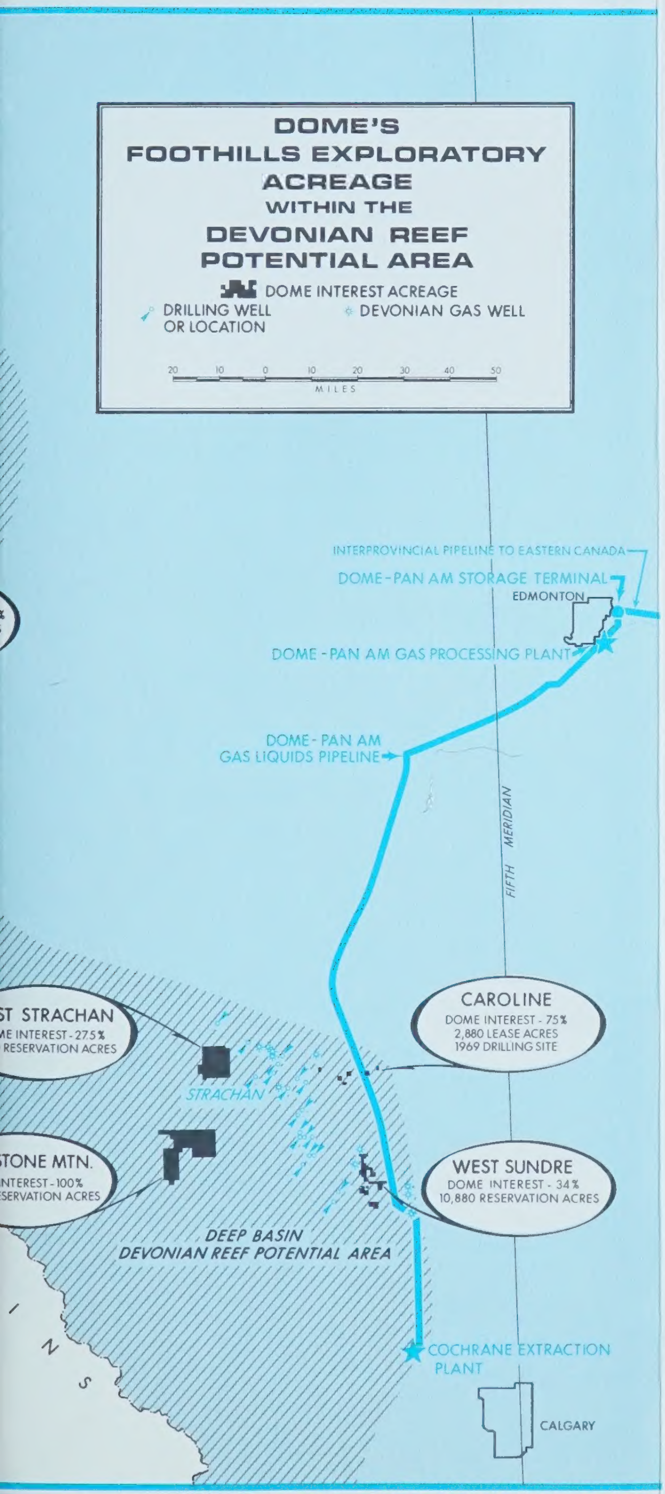
Land holdings at June 30, 1969, totalled 24,575,992 gross acres (19,923,276 net acres) of oil and gas rights. This represents a 9% increase in the second quarter from the 18,317,427 net acres held at March 31, 1969.

During the period under review, the Company made a number of substantial land acquisitions along the Alberta foothills where major Devonian reef gas discoveries, such as Strachan and West Sundre, have recently been completed.

### West Sundre

Dome recently participated for a net 34% interest in the acquisition of a 10,880-acre drilling reservation in the west Sundre area of central Alberta. This land is offset by 2 discovery gas wells, one of which is indicated to have a major sour gas payzone. Early development of this acreage is planned.






### West Strachan

File

Dome holds a 27½% interest in 28,160 reservation acres in this area. A deep test well on this acreage is planned before year-end.

### McLeod West

A 17,000-foot exploratory well is currently drilling on this 93,361-acre lease block in which Dome holds an 8.51% average interest.

### Kakwa

The Company participated to the extent of a 30% interest in the acquisition of 115,200 reservation acres in this area. This increases the Company's holdings in this immediate area to 205,920 gross acres and 48,168 net acres. A seismic program is currently being conducted preparatory to the drilling of an exploratory well.

### Grovedale

Dome holds 9,755 wholly-owned lease acres in this area. Gas has been discovered in the vicinity of this acreage and recent drilling reservation purchases by other companies adjoining these properties have been in the multi-million dollar range.

The location of this foothills acreage is shown on the accompanying map.

### Bowser Basin

Dome's exploratory well located on a 3,123,000-acre permit block in the Bowser Basin area of northwestern British Columbia is currently drilling below 5,800 feet. A farmout agreement has been made with Canadian Pacific Oil & Gas Limited. The effect of this and another agreement is that Dome will pay 22.9% of the drilling costs and retain a 50% interest in the acreage. Minor gas shows have been encountered below the 5,500-foot level indicating the presence of live hydrocarbons in this completely unexplored basin.

### Panarctic

Dome holds a 4.06% interest in Panarctic and owns 5,784,000 net acres in the Arctic Islands. Panarctic Oils Ltd. is drilling the first test wells in its exploratory program covering 50,000,000 acres in the Canadian Arctic Islands. One of these wells has encountered high pressure gas and oil staining. Due to difficult drilling conditions associated with controlling the high

pressure gas, these shows will not be tested until the well is completed.

## L. P. G. PROJECTS

### Cochrane/Sarnia

Contracts have been awarded for the various phases of the Company's 1969 construction program involving 2 LPG processing plants, a pipeline facility and 3 major storage terminals.

The Alberta Natural Gas Company's extraction plant at Cochrane, Alberta, is being built on a cost of service basis for Dome and Pan American Canada Oil Company, Ltd. It is scheduled to be completed early in 1970.

A contract has been awarded for the construction of a 186-mile, 8-inch pipeline that will transport the product from the Cochrane plant to the Dome-Pan American storage terminal in Edmonton. Work is also underway on the construction of a 60,000-barrel high pressure storage terminal at Edmonton and a 150,000-barrel storage terminal at Superior, Wisconsin. These projects are due to be completed this fall.

Construction has commenced on the Dome-Pan American 27,000-barrel per day fractionation plant at Sarnia, Ontario, which is scheduled to be completed early next year. The Sarnia plant will process natural gas liquids produced at Cochrane and transported to Eastern Canada via the Company's pipeline to Edmonton and then through the Interprovincial pipeline to Sarnia.

### Empress

Dome and Trans-Canada Grid of Alberta, Ltd. (a TransCanada PipeLine subsidiary) plan to construct facilities at Empress, Alberta, to extract natural gas liquids from the next 1.5 billion cubic feet of gas per day available from the TransCanada stream. This product will also move to Sarnia, Ontario through Interprovincial Pipe Line and be processed at the Company's Sarnia fractionation facilities.

Approval of the project has been received from the Alberta Oil and Gas Conservation Board and construction will begin in 1970.

August 11, 1969.

## CONSOLIDATED STATEMENT OF INCOME

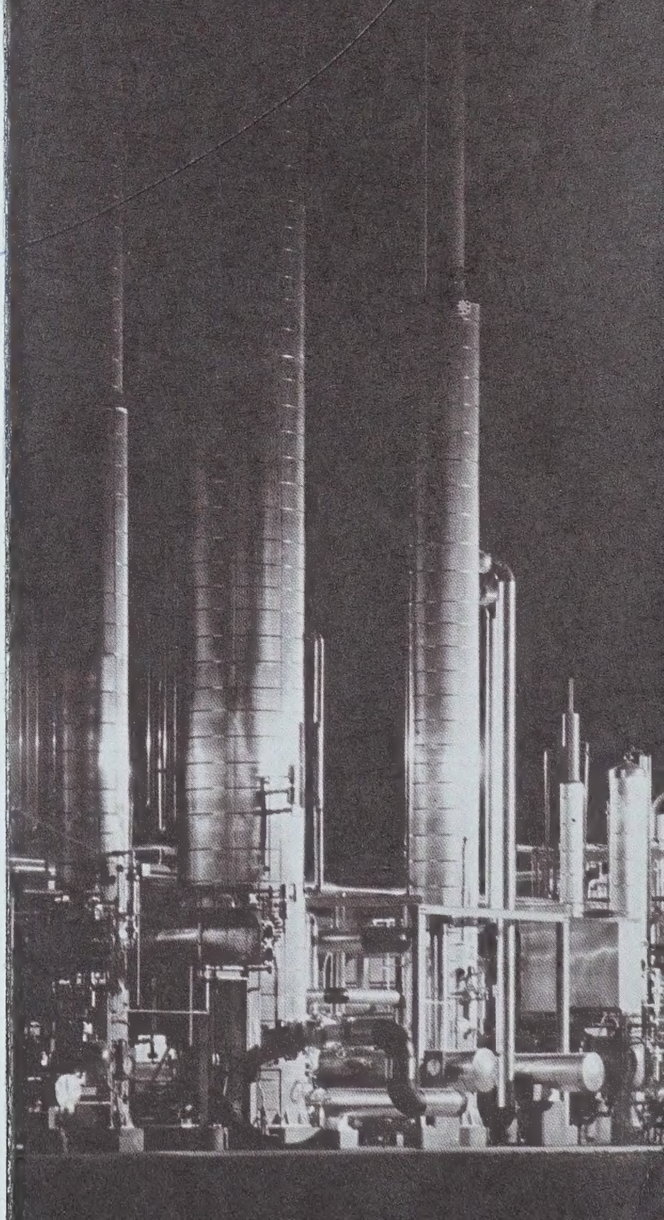
**Six Months Ended June 30, 1969 and 1968**

| | *1969* | *1968* |
|---|---|---|
| INCOME: | | |
| Oil and gas sales after royalties | $ 7,945,000 | $ 7,672,000 |
| Propane and other product sales | 3,404,000 | 3,883,000 |
| Other income | 614,000 | 462,000 |
| | 11,963,000 | 12,017,000 |
| DEDUCT: | | |
| Operating expenses | 2,665,000 | 2,450,000 |
| Cost of propane and other products sold | 1,091,000 | 1,054,000 |
| General and administrative expenses | 254,000 | 263,000 |
| Interest | 1,352,000 | 1,167,000 |
| | 5,362,000 | 4,934,000 |
| CASH FLOW | 6,601,000 | 7,083,000 |
| DEDUCT: | | |
| Depletion | 1,130,000 | 1,047,000 |
| Depreciation | 998,000 | 1,052,000 |
| Amortization | 42,000 | 38,000 |
| | 2,170,000 | 2,137,000 |
| NET INCOME FOR THE PERIOD | $ 4,431,000 | $ 4,946,000 |
| INCOME PER SHARE FOR SIX MONTHS ENDED JUNE 30: | | |
| Outstanding shares | 3,366,637 | 3,347,362 |
| Gross income | $3.55 | $3.59 |
| Cash flow | 1.96 | 2.12 |
| Net income | 1.32 | 1.48 |

THIS STATEMENT IS UNAUDITED.

# DOME PETROLEUM LIMITED

## INTERIM REPORT DEC. 31, 1969



PRINTED IN CANADA

## FINANCIAL

Dome's 1969 operating results were as follows:

Gross income totalled $23,800,000 compared to $24,561,000 in 1968.

Cash flow was $12,800,000 or $3.80 per share compared to $14,452,000 or $4.31 per share in 1968.

Net income totalled $8,425,000 or $2.50 per share compared to $10,078,000 or $3.00 per share in 1968.

The decline in income during 1969 is due to lower product prices, higher interest charges on increased debt and higher operating costs. An improvement in income is expected in 1970, particularly in the last quarter when facilities now under construction are fully operational and the anticipated increase in product prices takes effect.

*(All 1969 figures are unaudited)*

## PRODUCTION

Production of oil, natural gas liquids and oil equivalent of gas averaged 23,955 net barrels per day in 1969 compared with 24,615 net barrels per day in 1968.

## DRILLING

In 1969, Dome participated in the drilling of 36 exploratory wells, 7 step-out wells and 32 development wells. These resulted in 17 oil producers (6.25 net) and 24 gas producers (16.54 net). Twenty-two wells were drilled at no cost to Dome.

## LAND

Land holdings at December 31, 1969, totalled 23,778,000 gross acres (19,127,000 net acres) of oil and gas rights, an increase of 3,196,000 net acres or 20% from 1968.

## EXPLORATION

### Arctic Islands

Panarctic's fourth well is now drilling on the 250-square mile Hoodoo Dome on southeast Ellef Ringnes Island. Upon its completion, Dome will retain a 50% undivided interest in the 500,000-acre group of permits on which the well is located.

The second Drake Point well on Melville Island tested 10 million cubic feet per day of gas at 3,750 feet and 13 million cubic feet per day of gas at 4,650 feet. Current depth is 10,050 feet where a porous zone is being tested.

### Mackenzie Delta

The recent announcement of an oil discovery at Imperial Oil's Atkinson Point H-25 well in the Mackenzie Delta has focused industry attention on this highly potential sector of the Northwest Territories. Dome owns 2,370,000 net permit acres in this general area, part of which lies less than 50 miles north of the discovery well.

### Bowser Basin

Due to severe weather conditions, the deep test well on the large Ritchie Anticline in the Bowser area of northwestern British Columbia was suspended until the spring of 1970. On completion of this well, Dome will retain a 50% undivided interest in the 3,123,000-acre permit block for 22.9% of the drilling costs.

### Alberta Foothills

Dome has acquired a total of 410,900 gross acres (93,900 net acres) and has the right to earn an additional 20,100 net acres in the highly potential deep Alberta Foothills Devonian gas play where three major gas fields have been found to date.

Dome will participate in the drilling of four deep tests in this area during the first half of 1970 where seismic surveys have been completed.

## INDUSTRIAL MINERALS

The 100-ton per day industrial minerals plant at Quesnel, British Columbia, is scheduled to go into production in February, 1970. Crude ore from the pozzolan shale and diatomaceous earth deposits has been stockpiled at the plant site and mining operations will resume in the spring.